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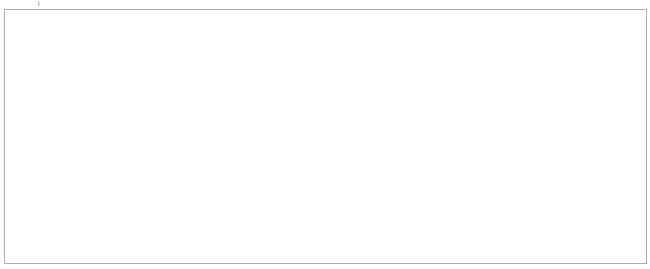

PRODUCTION OF AIRFORCE TRAINING DEVICES AT ZEISS, JENA

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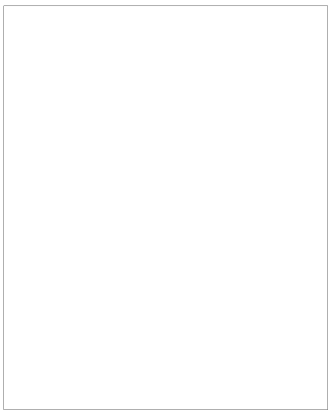

18 September 1950

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SECRET

Specifications for Acceptance of Mirror Controls with Cruciform Slide

(German Translation from the Russian)

1. Cleanliness:

a) Mirror surface:

The silver coating of the mirror must have no gaps. The errors in the mirror surface must not exceed the tolerances as specified in the drawings. Checking is carried out by visual inspection.

b) Mechanism:

All external surfaces must have clean finish, without scratches or bubbles. Galvanized surfaces must have no deposits or spots.

2. Position of the Mirrors:

In the ~~basic~~ central (basic?) position of the cruciform slide, i.e. if the spherical transmission remains in its center position while the slide is being rotated about its vertical axis, the mirrors must be at angles of 45 ' 0.5^{0}. Testing is carried out by means of an "auto-collimator".

If the spindle is moved all the way to the stop, i.e. at the outermost position of the spherical transmission, nothing must touch the mirrors while the cruciform slide is revolved about the vertical axis. The lateral deviation of the mirrors from the optical axis must not exceed 0.5^{0}. Testing is carried out by means of a collimator.

3. Mirror drive system:

Before the attachment for adjusting ~~the~~ the mirrors (1) (1) is fitted, the mechanism of the attachment must be checked for proper functioning and turning. After assembly of the motors and the attached lines, rotation of the spindles in both directions must be even, at a voltage of (figure not inserted) volts, until the screws hit the stop. With a voltage supply of 24 v, the distance between the two end positions must be traversed in a time of (figure not inserted) seconds.

4. Rotation of the cruciform slide:

The rotation of the cruciform slide alone must be accomplished by means of motor drive and an additional transmission mechanism at a voltage of (figure not inserted) v, evenly in both directions. At a voltage of 24 volts, a 360^{0} turn must take place ~~xxxxxx~~ in 1 second. After assembly of the "Pankrat" (Russian term - "

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not translated in the German text) the corresponding data are given:(figures not given in the text) .... volts or ... seconds; after the mounting of the landscape projector or movie projector: ...volt or ... seconds.

5. The upper mirror

The mirror should be easily covered, uncovered, installed and removed. The adjusting screws must function properly.

Acceptance Specifications for the Mechanisms 1:63, 1:222 and 1:813.

(German translation from the Russian)

1. Proper functioning

The mechanisms must run smoothly. Checking is carried out at first manually, without a motor, then by means of a motor with a special control attachment. At ...(figure not inserted) volts even rotation in both directions must take place.

2. Sliding couplings (may also mean "friction clutches")

They must be adjusted so exactly that they will transmit the following maximum rotational moments:

mechanism 1:63: ... cm kg

mechanism 1:222: ... cm kg

mechanism 1:813 ... cm kg

(The numerical values are not inserted).

Checking is carried out by means of a spring scale.

If the motor is started with 24 volts and the output side is locked* the "sliding coupling" must function, i.e. the motor must run.

of Acceptance Test
Protocol No. .../of Set of Type ... , No. ..., Date ... ... 1950, determined in checking the angular velocities according to altitude and course at different angles of the artificial horizon of the trainer. (German transl. from the Russian).

1. - 1,100 m

2. Position of the switches

a) 4 and 5 shut off

b) T_2, T_3; -"p"

c) Use rudder and elevator.

Plus sign means "to the right", toward the pilot.

Minus sign means " to the left", away from the pilot.

* Probably translated from a Russian word which also means "back in"

Table:

No.	Position of controls		Direction of displacement of the object	-90^0 reading according to:	
	Elevator	Rudder		altitude	course
				Tolerance:	
				OTK SP	OTK SP

For numerical values see original.

Note to table in German translation: The meaning of the abbreviations OTK and SP could not be determined. OTK might stand for "otklonenie" (deviation).

Signature of manufacturer: Signature of consignee:

Acceptance Specifications for Reflex Sights

(German Translation from the Russian)

1. Attaching of the Mirror 08 14 20 U1(2) and U2(3) and U4(3), U(5) to U(8).

At the 45^0 position, the sliding surfaces of the lever of the parallelogram must be parallel and at the same level with the base surface of the support. The tolerance is ± 0.03 mm; this corresponds to a vertical deviation of $\pm 6^0$ and a lateral deviation of ± - 12° of the mirror. [redacted] Checking is carried out by means of an autocollimation tube and a highly sensitive lever.

Drive and motion of the parallelogram must function properly before the mirror is mounted (laterally and vertically). The mirror must follow every positio of the lever of the parallelogram automatically and without any jamming.

If the transmission pin of the parallelogram is moved ±3.82 mm, the mirror can be displaced by ±30° laterally and ±15° vertically.

Checking is carried out by means of an auto-collimation tube and an "indicator clock. The pressure of the piston for the displacement of the mirror in vertical direction is to be ... grams to ... grams, for the displacement in lateral directio ... grams to ... grams (numerical values not inserted). Checking is carried out by means of a spring scale.

2. Mechanism for the mirror drive. 08 14 20 U9(4)

The mechanism must function properly. The sliding surfaces of the "angle bars' must be parallel with a tolerance of 0.03 mm. Checking is carried out by means of an "indicator clock". In this position the segment of the face wheel must be in the center of the drive wheel, with a tolerance of ± 1 mm.

3. Mechanism for the mirror drive

08 14 20 U 10(4) and U 12(4)

The mechanism must function properly. If the sliding surfaces of the "angle plate" are parallel to the base surface of the support, the segment of the face wheel must be in the center of the drive wheel, with a tolerance of ±1 mm. The pin of the sphere must be vertical to the sliding surface of the "angle plate". The inspection is visual.

4. Mechanism 08 14 20 U 13

The mechanism must function properly. Inspection is manual.

5. E- displacement (for the trainee)

08 14 20 U 17(4)

The "bar" for the E (Entfernung - distance ?) displacement must function properly. The guides of the slide must be parallel with a tolerance of ±0.01 mm. Checking is carried out by means of an "indicator clock". The slide (18) must run freely and without jamming in the guide.

6. E- spindle (for the instructor) 08 14 20 U 19(4)

The drive shaft must work properly and without jamming. The guide of the slide must be parallel with a tolerance of ±0.01 mm. Checking is carried out by means of an "indicator clock". The slide must run freely and without jamming in the guide. After the guide of the slide has been moved by 22 mm, the "cut-off switch of the "final position" must be lifted.

7. S-mechanism (?) 08 14 20 14

The mechanism must function properly. Checking is manual.

8. E- converter (?) 08 14 20 U26(2)

The drive for the oscillation of the wings of the aircraft must function properly between the rest positions. The rest positions must be sensitive. Checking is carried out by means of an "auxiliary attachment". All displacements caused by the "angle lever" must function freely without jamming. The pressure of the tip (?) of the"feeler pin" must be ... grams to ... grams (numerical values not inserted). The position of the bent plate in relation to the marked plate ("Strichplatte") is checked by means of Table No. ... (number not inserted). The contacts for the resistance must be properly connected. A test is carried out.

The distance of the marked plate must be no more than 0.05 mm. The marked plat must be centered in such a way that the luminous lozenges are evenly centered only

in one of the eight possible positions. Checking is carried out visually at the narrowest point.

9. The plate of the mechanism 08 14 20 U35(1)

If the drive wheel for the E-spindle is turned 266°, from stop to stop in the mechanism U13, the guides of the slide must cover a distance of 22 mm.

When the slide surfaces of the "angle plates" are parallel to the base surface, the stops [redacted] (resistances?) of mechanism 13 and the corresponding potentiometer must be at their center positions. All drives at the plate of the mechanism must function properly. Particular care must be taken to see that the "connecting key" between the "angle bar" and the slide surface does not jam.

The tension spring, attached underneath the "E-displacement", must be so strong that the mechanisms moving in longitudinal direction are pressed firmly against their stops. The front spring must be so strong that it is stretched only when the first spring is fully stretched, i.e. when the movable mechanisms are displaced all the way to the stop. The [redacted] screw nut for the "E-displacement" must be attached to the axis and fastened in such a manner that in the initial position of the "E-displacement" (part of the guides of the slide of the spindle [redacted] or of the "bar") no displacement of the slide will occur when the "angle bar" is turned. Checking is carried out by means of an "indicator clock".

The slide surfaces of the "angle bars" in the vertical direction are in the zero position, if the slide does not change position during its displacement of 22mm [redacted]. Checking is carried out by means of an "indicator clock". In the displacement of the (one) part of the guide of the spindle slide or of the "bar" by 22 mm and in turning of the "angle [redacted] plates" by 10°, the slide must move forward by 3.82 mm. The resistances of mechanism U 13 must operate in this case.